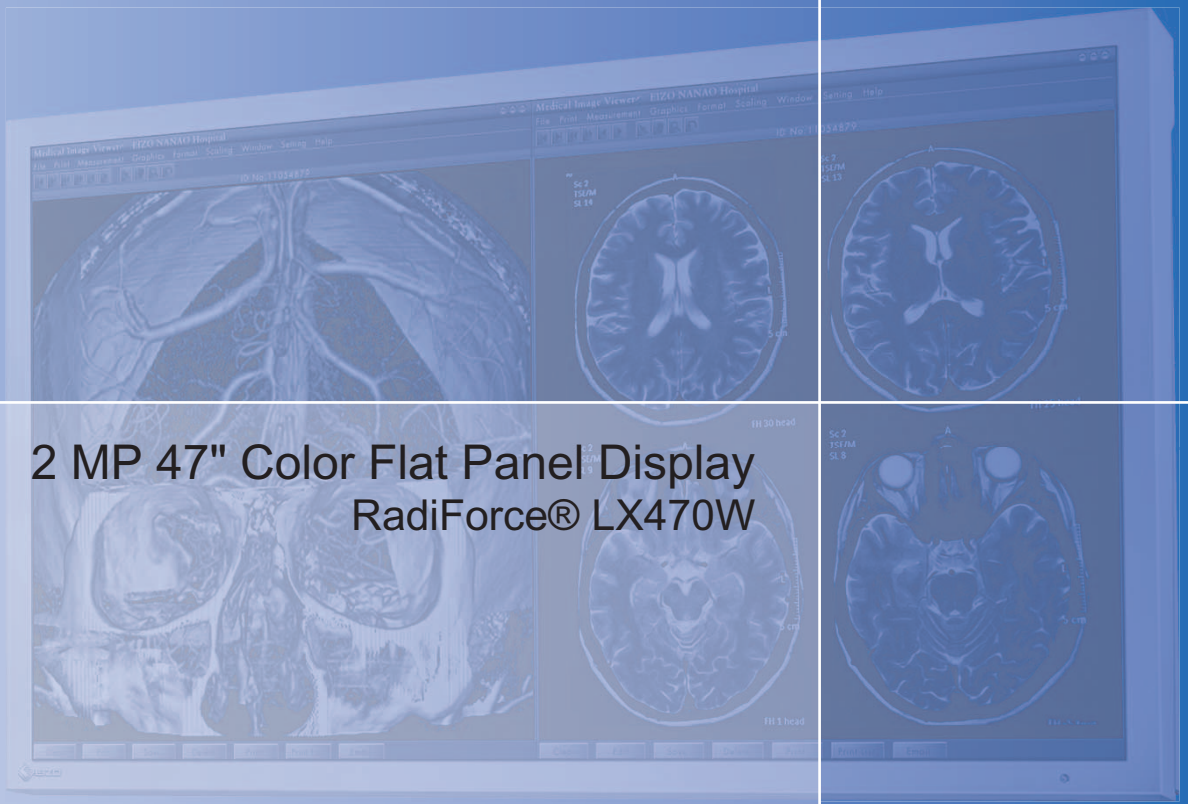
Instruction Manual • 06/2010



2 MP 47" Color Flat Panel Display
RadiForce® LX470W

display SOLUTIONS

EIZO®

LCD displays for medical applications

2 MP 47" Color Flat Panel Display RadiForce® LX470W

Instruction Manual

Introduction 1

Safety information 2

Description 3

Application planning 4

Mounting 5

Connection 6

Commissioning 7

Software description 8

Operate 9

Service and maintenance 10

Technical specifications 11

Dimensional drawings 12

Appendix A

List of abbreviations B

06/2010
1015263-001

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of EIZO products

Note the following:

⚠WARNING
EIZO products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by EIZO. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of their respective owners. Please refer to the trademarks listed in the appendix. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

EIZO GmbH
Display Technologies
Siemensallee 84
76187 KARLSRUHE
GERMANY

1015263-001
℗ 06/2010

Copyright © EIZO GmbH 2010.
Technical data subject to change

Table of contents

1 Introduction 7

1.1 Contents of this document 7

1.2 Additional documentation 7

2 Safety information 9

2.1 General safety notes 10

2.2 Product-specific safety notes 14

3 Description 15

3.1 Scope of delivery 15

3.2 Applications 15

3.3 Important features 16

4 Application planning 19

4.1 Installation site 19

4.2 Distances and arrangement of units 20

5 Mounting 21

5.1 Mounting the device 21

6 Connection 23

6.1 General connection information 23

6.2 Connector location 24

6.3 Connector panel 25

6.4 Connecting the signal cables 26

6.5 Connecting the power cord 28

7 Commissioning 29

7.1 Switching on the unit 29

7.2 Operator controls 29

7.3 Description of OSD menu 30
7.3.1 OSD overview 30
7.3.2 Menu functions 30
7.3.3 Lock/unlock OSD menu 41
7.3.4 Picture layout (PaP/PiP/PoP) 42

7.4 Implementing settings 44
7.4.1 Avoidance of image sticking 44
7.4.2 Adjusting the image geometry 44
7.4.3 Adaptation of display – video source / graphics card 44
7.4.4 Power management 46
7.4.5 Check for pixel defects 46

8 Software description 47
8.1 Program for changing the display settings 47
9 Operate 49
9.1 Note for users 49
9.2 Switching on the display 49
10 Service and maintenance 51
10.1 Cleaning 51
10.2 Maintenance 52
11 Technical specifications 53
11.1 Display features 53
11.2 Power supply 53
11.3 Electronics 54
11.4 Inputs/Outputs 54
11.5 Controls and connectors 56
11.6 Mechanical design 56
11.7 Climatic conditions 56
11.8 Mechanical requirements 57
11.9 Safety regulations 57
11.10 Electromagnetic compatibility 58
12 Dimensional drawings 59
A Appendix 61
A.1 Guidance and manufacturer's declaration – electromagnetic emissions 61
A.2 Nameplate 62
A.3 Warranty 64
A.4 Repairs 64
A.5 Environmental protection 64
A.6 Accessory devices 64
A.7 Trademarks 65
A.8 Contact 65
A.9 China RoHS (Restriction of Hazardous Substances) 66
B List of abbreviations 69
Index 71

Introduction 1

1.1 Contents of this document

This document explains the functionality and the approved application of the RadiForce LX470W 47" Color Flat Panel Display.

To ensure clarity, it does not contain all detailed information on this product.

The contents of this document are neither part of a previous or existing agreement, commitment or legal relationship, nor does it modify such.

1.2 Additional documentation

Note

These instructions are available on the supplied CD-ROM and on the Internet page of (http://www.eizo.eu)

SMfit Total Care

Brief instructions for the software "SMfit Total Care".

The context-sensitive help is integrated in the software.

Safety information

2

Please note that LCDs such as the RadiForce® LX470W do not exhibit a zero error rate and that the image parameters can change over time (e.g. color density or distortion/fading of colors).

- Please ensure that all necessary steps are taken to avoid violations or incorrect diagnoses.
- Regular maintenance and calibration are recommended.

In this document, the term "users" refers to medical personnel (e.g. radiology technician, medical technician), while the term "servicing" implies specifically trained and authorized personnel (e.g. hospital technician, medical equipment manufacturer).

2.1 General safety notes

Flawless, safe and reliable operation of the equipment assumes that it has been professionally transported, stored, mounted and installed as well as careful operator control and service. The units may only be used for applications for which monitors are normally used.

For safety reasons, the following precautions must be observed:

⚠ DANGER

There is a danger to life if warnings are not obeyed. Severe personal injury or damage to property may occur. Please observe all warning information present on the display and in the instruction manual.

Do not open the display

The display may only be opened by trained and qualified personnel. There is risk of an electric shock.

Components inside the displays are at high voltage. **Touching these components is extremely dangerous!**

Servicing and maintenance must be carried out by qualified personnel only.

No liability is accepted for damage to property or injury to persons if the display is opened by non-qualified personnel.

Never use defective power cables

A damaged power cable may result in fire or electric shock. Only use power cables approved by the manufacturer.

When disconnecting the power supply cable, always do so by holding the plug. Ensure that your hands are dry.

Route the cable such that it cannot be tripped over.

Do not insert any objects into the housing

Objects inserted into the housing may result in damage to the unit or personal injury.

Do not place any objects on top of the unit

Liquid entering the unit may result in fire or electric shock.

Connecting

There must be no contact to a patient when handling the connection cables.

Overload

Do not connect too many devices to one socket or extension cable since this could result in a fire or electric shock.

Observe the information provided by the manufacturer.

CAUTION

Improper installation may result in extensive damage to property.

Installation must be carried out by specialists.

1. To avoid danger for patients and users, connect your electrical system in accordance with the safety requirements of EN 60601-1-1 (IEC 60601-1-1) "Safety requirements for medical electrical systems".

   In order to guarantee that the housing discharge current in the event of a first fault does not exceed 500 µA, the display must be connected to an additional PE connection. The bracket of the display's support mechanism has its own grounding (PE conductor). This grounding together with the PE conductor of the display means that the housing discharge current always remains less than 500 µA, even in the event of a first fault. The PE conductors of the display and of the separate PC are considered as a first fault event.
2. Use appropriate measures to ensure that the leakage currents in particular remain below the necessary limits:

   Appropriate measures include:
   - Separators for signal input or signal output unit
   - Use of a safety isolating transformer
   - Use of the additional protective conductor terminal
3. Device and patient must never be touched simultaneously.
4. It must be specifically mentioned that the display is only suitable for a patient environment, but not for contact with a patient.
5. Only use video cables with BNC connectors and interface cables which are specified by the manufacturer.

   The serial interface cable must have a female Sub-D connector at the computer end.
6. Use power cables with PE contacts. Only plug the device into sockets with protective grounding.
7. For certain applications, the video ground can be connected separately to the PE via the additional PE conductor in the connection panel. **Observe EN 60601-1-1 (IEC 60601-1-1)**.
8. Close the connection panel using the cover provided, and secure with the screws.
9. **Note for users:**

   The closed connection panel may only be opened by trained and qualified personnel.
10. **Servicing information:**

    If housing parts have to be removed for servicing, this must not be carried out in the presence of the patient or user. Only connect displays with a VESA connection on the rear panel to the power supply when the VESA plate is screwed on.
11. **Important:**

    Note that displays can fail and that the image properties such as brightness, contrast or color location can change with time.

Please ensure that all steps are taken to avoid injuries or incorrect diagnoses. Regular maintenance and calibration must be carried out e.g. with SMfit Total Care. Observe all regulations of the country in which the display is used.

CAUTION

Failure to observe warnings may result in substantial damage to property

Ensure sufficient heat dissipation

Ventilation slots are provided on the housing base, the top of the cover, the rear panel and the side panels. The permissible ambient temperature range (see instruction manual) must not be violated.

- Installation on a desk:

  Place the display on a hard, level surface at least 10 cm from the wall and 15 cm away from other devices.
- For ceiling suspension:

  Distance from wall at least 10 cm. Several displays can be mounted horizontally or vertically and directly adjacent to one another.

Avoid sources of heat

Do not install the display in the vicinity of sources of heat, e.g. radiators, heating appliances or other devices which can generate or emit heat.

Do not subject display to excessive shocks

Take care when transporting! **Use the original packaging, and transport correctly oriented!** Be sure to protect the LCD module in particular from shocks.

Care of display / Cleaning agents

- The screen surface (front panel) is extremely sensitive to mechanical damage. Absolutely avoid scratches, shocks etc.
- Remove water drops immediately; extended contact with water discolors the surface.
- Clean the screen and the housing using only the cleaning agents referred to in the instruction manual.

NOTICE

Touching the screen surface can result in brief disturbances to the image

Due to mechanical pressure or electrostatic discharging, touching the screen can result in brief disturbances to the image.

Only switch on cold displays following their adaptation to room temperature

If the display is brought into a room with a higher or rising temperature, condensation is formed inside and outside the unit. In such a case, do not switch on the display until the condensation has evaporated. The display will otherwise be damaged.

What to do if the display is faulty

If the following conditions exist, the display must be disconnected from the power supply and checked by qualified personnel:

- Damage to the plug or power cable.
- Following the entry of liquid into the unit.
- If the unit has been exposed to moisture.
- If the unit does not function or if you cannot eliminate a fault using the instruction manual.
- If the unit has been dropped and/or the housing damaged.
- If the unit smells of burning or produces peculiar noises.

Information for installations in the USA and Canada

Molded power supply plugs must comply with the requirements for "hospital grade attachments" CSA Std. C22.2 No. 21 and UL 498.

Information for installations in China

Only use the the power cables approved for China. These power cables are identified by the labels "CCC" or "CQC".

See also

Installation site (Page 19)

Distances and arrangement of units (Page 20)

Mounting the device (Page 21)

General connection information (Page 23)

Connector location (Page 24)

Cleaning (Page 51)

Safety regulations (Page 57)

2.2 Product-specific safety notes

If the equipment has been designed or, when required, modified for connection to an IT power distribution system, the equipment installation instructions shall so state.

⚠ DANGER
Touching the monitor A patient and the monitor must not be touched simultaneously by a person or chain of persons.

CAUTION
1. Do not connect devices which are not part of the medical system. 2. The device must only be opened by trained personnel. Disconnect the power plug before opening the device.

Description 3

3.1 Scope of delivery

Note

EIZO recommends that you keep the packaging material for subsequent transport of the display.

RadiForce® LX470W

2 MP 47" Color Flat Panel Display.

RadiForce® LX470W white	Order No.: 6GF6260-5FA10
RadiForce® LX470W black	Order No.: 6GF6260-5FA11

Additional components in scope of delivery

- CD with user manual and SMfit Total Care
- Power cord for Europe
- Power cord for US
- Power cord for China
- DVI cable
- Remote control

3.2 Applications

The RadiForce® LX470W Color Flat Panel Display has been specially designed for use with medical imaging. It is envisaged for installation in a ceiling suspension system.

3.3 Important features

Performance features

The display has the following features which permit a wide range of applications:

Large 47" picture diagonal

With a picture diagonal of 47" and a resolution of 1920 x 1080 pixels, the display is suitable for simultaneous use of several image sources. The display is particularly suitable for DICOM x-ray images or as a second monitor for surgery or endoscopy.

Perfect picture reproduction thanks to LCD technology

Distortions in the image geometry do not occur with LCD technology.

The flat panel display provides a flicker-free picture even with low refresh rates. The display thus fulfills even the strictest ergonomic requirements.

The Color Flat Panel Display has a TFT display module with a very wide viewing angle. The use of state-of-the-art LCD technology allows a high luminance.

Fully Automated Stability

The Color Flat Panel Display is equipped with an automated stability system (Fully Automated Stability) in accordance with the DICOM standard. The integrated stability system (ISS) ensures consistent luminance levels using an integral light sensor in the center of the backlight. Using SMfit Total Care and an external photometer option obtainable from EIZO, the ISS sensor is automatically adjusted to ensure traceable calibration.

The display is precalibrated in the factory. It is supplied from factory with a total of five defined look-up tables. The saved calibration data simplify installation and servicing: Even if the graphics card or workstation is replaced, e.g. during upgrade, the graphics settings are retained and there is no need to recalibrate the monitor.

Communication interface

The operating states of the display can be read via the communication interface which is connected via the DVI port: The display can be set to a Power Safe Mode. In particular the operating capability of the display can be scanned via this interface in critical systems.

Simultaneous display of different image sources

The versatile signal inputs can be used either for a "picture-in-picture" display, or next to each other with use of the widescreen format.

Settings for optimizing the application

The reproduction properties can be adapted using the SMfit Total Care software tool to achieve optimum picture display.

The display can be adapted to the local lighting conditions at the click of a mouse using the five preset practice-oriented look-up tables or automatically calibrated to the desired luminance levels using the LUT calculation function of the SMfit Total Care software.

RGB input (15-pin Sub-D/DVI/HDMI)

The display is connected to the computer system using either the 15-pin Sub-D connector, the DVI-I input socket or the HDMI input socket. BNC connections such as RGBS, SoG or YPbPr can be plugged into the VGA input via adapter cables.

If necessary, the display is adapted using an OSD menu.

Video inputs

The display has additional video inputs such as HD-SDI, S-Video and Composite. The display can therefore be operated with analog standard video signals (PAL/NTSC/HD). The RGB and video inputs can be simultaneously connected to different signal sources.

Protective glass

The RadiForce® LX470W has anti-glare protective glass fitted over the top of the LCD panel to protect the surface of the panel against bumps and scratches. The display is protected at the front against moisture (IPx4 protection). The space between the protective pane and the panel is sealed to prevent dust from entering, thus helping ensure the internal surfaces remain clean.

Application planning 4

4.1 Installation site

Provide adequate ventilation

Ventilation holes are located on the rear of the housing. These ventilation holes must not be covered or closed, since otherwise the heat generated in the device cannot be dissipated sufficiently.

Avoid dusty environments

The display has been designed for use in the clean environment of medical diagnostics. The display dissipates heat through the openings at the rear. Dust from dirty environments can penetrate into the display through these openings. In the extreme case, deposits are possible which become evident as dark spots in a white picture and which can result in deterioration of the luminance. Protect the display from dust, e.g. during building measures at the installation location, and use the original packaging or service packaging for transport.

Observe the permissible ambient temperature range

The unit must not be operated outside the permissible ambient temperature range.

Avoid reflections on the screen

The display has an anti-glare surface which is only effective with a clean, grease-free screen.

The display is equipped with a protective glass pane with a non-reflective optical coating on both sides and is particularly suitable for use in sterile environments when cleaning agents are used.

If the screen surface is dirty, clean it using a suitable microfiber cloth.

Please note the additional cleaning instructions, see the section "Service and Maintenance" (Page 51).

- Position the display so that reflections of lights, windows, furniture with shiny surfaces or light-colored walls do not appear on the screen.

In order to reduce mirroring on the unit, only use non-dazzling reflector lights for the ceiling lighting.

Change of environment

If the unit is brought into a warm environment from a cold one, condensation may form in the unit. The unit should not be switched on until all the condensed water has evaporated, including that inside the unit. This may take several hours, depending on the conditions.

See also

General safety notes (Page 10)

Cleaning (Page 51)

4.2 Distances and arrangement of units

Minimum distances from other devices and a wall

The display has a VESA-400x200 installation connection. The display should be positioned at least 10 cm at the side and rear from a wall, or 15 cm from other equipment.

The display, especially the panel surface, is sensitive to shock. An impact on the panel surface can lead to total failure. Avoid such mechanical influences at all costs.

If the display is installed to be movable

make sure that the moved mass does not endanger persons or fittings.

See also

General safety notes (Page 10)

Mounting 5

5.1 Mounting the device

Taking the device out of the packaging

⚠ CAUTION
• The device must be removed from the packaging and carried by at least 2 persons. • Wear appropriate protection to prevent injuries should the device be dropped.

1. Open the packaging carefully and remove from the display.

   Make sure that the display cannot tip over.
2. Hold the device at the bottom and side, and remove from the packaging.

Mounting the device

The display has a VESA adapter/400 x 200 mm.

Since the screws are of particular importance for the installation, observe the following:

Fastening screw specifications	
Number	4
Thread	M8
Strength	8.8 in accordance with ISO 898-1
Insertion depth	10 mm (minimum) / 12 mm (maximum)
Tightening torque	Max. 10 Nm

- Make sure when installing the display that the adapter is designed for 4-fold safety (monitor mass is approx. 40 kg).
- An installed stand must be sufficiently stable such that tilting (up to 10°) does not result in toppling of the device.
- Mounting units, e.g. a stand or wall bracket, must be tested and approved by the manufacturer for the weight to be supported. It is therefore advisable to use the display manufacturer's mounting units since these satisfy the required demands.

See also

General safety notes (Page 10)

Connection 6

6.1 General connection information

⚠ CAUTION

All information and warnings related to this product must be observed to ensure danger-free operation.

CAUTION

Observe shielding measures

The shielding measures described in the applicable national EMC guideline must be observed. If these guidelines are not observed, malfunctioning of the display may result.

Observe the grounding measures

To ensure that the permissible leakage current is not exceeded in the case of a fault, you must additionally ground the monitor with a separate ground line.

Information on cable installation

- Only shielded cables are permitted for all signal connections.
- If the relevant facility is available on the connector, all plug connections must be screwed tight or locked.
- If signal and power supply cables are routed next to one another, reversible pixel errors may occur if there is high interference on the power supply network.
- The display must not share a power supply with motors or valves (interference!).
- Externally connected cables can represent a trip hazard. Make sure that all incoming cables are safely routed.
- Cable grips are provided in the device. Use these to secure the cables against unintentional loosening.

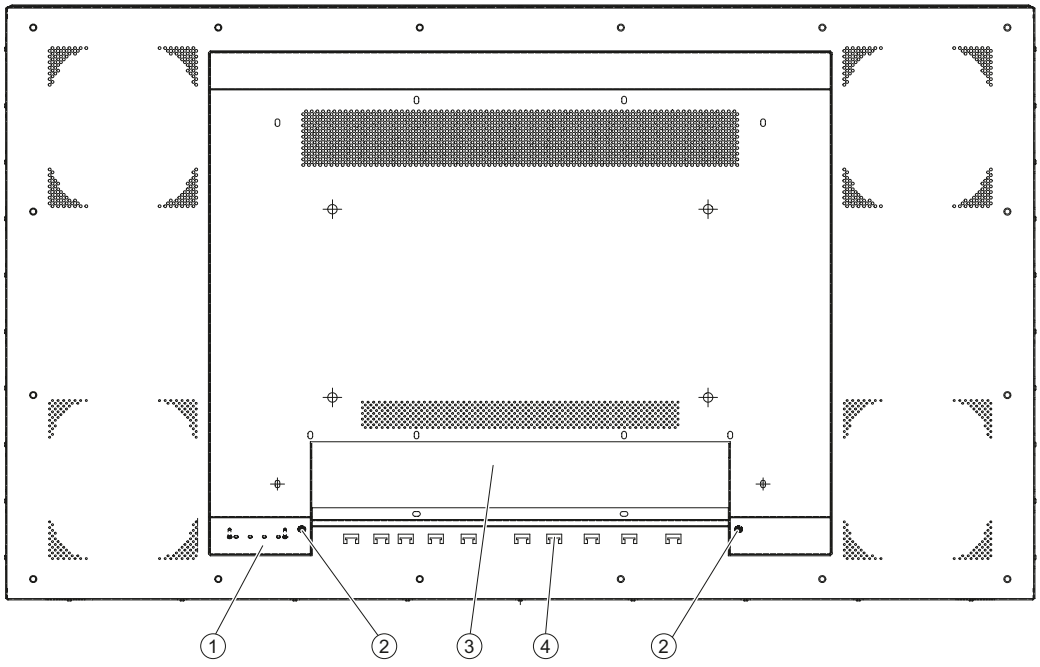
See also

General safety notes (Page 10)

Electromagnetic compatibility (Page 58)

6.2 Connector location

The connectors are located within the connection compartment under the cover on the rear of the display.



① OSD operation
② Screws for the cover
③ Cover
④ Strain relief for the cables

Figure 6-1 Rear view of RadiForce® LX470W

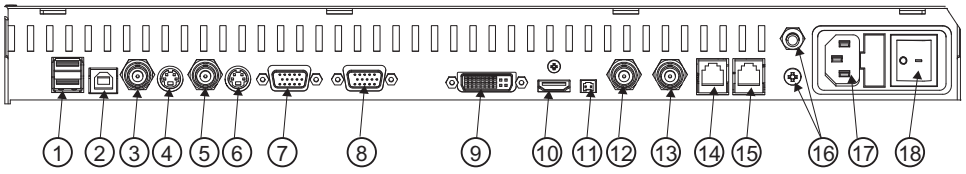
See also

General safety notes (Page 10)
Connector panel (Page 25)

6.3 Connector panel

Connections

A connection panel for the signals and power supply is located at the rear of the Color Flat Panel Display.



①	USB-A	⑩	HDMI
②	USB-B	⑪	5 V/1 A
③	Composite Out	⑫	HD-SDI In
④	S-Video Out	⑬	HD-SDI Out
⑤	Composite In	⑭	RS 232 Bus Service/Up
⑥	S-Video In	⑮	RS 232 Bus Service/Down
⑦	VGA Out	⑯	Grounding
⑧	VGA In	⑰	Power connector
⑨	DVI	⑱	Power switch

Figure 6-2 Connection panel of RadiForce® LX470W

See also

Connector location (Page 24)

Connecting the signal cables (Page 26)

Connecting the power cord (Page 28)

6.4 Connecting the signal cables

CAUTION
When installing the cable, avoid danger of tripping
Route the cable such that it cannot be tripped over.

CAUTION
Use identical cable lengths for R, G and B signals
When connecting to the RGB analog sockets, the three cables for the R, G and B signals must be of equal length. Otherwise, color fringing, which appears similar to convergence faults, will occur due to unequal propagation times.

Note

Names of the image signals

The image signals coming from a graphics card are referred to below as RGB signals, and those coming from a camera, DVD player, video recorder etc. as video signals.

In the OSD menu, some of the menu displays are also appropriately identified by RGB or video in the header.

The signal connections are located at the rear of the flat panel display.

- You may connect all signal inputs simultaneously.

15-pin Sub-D socket

Various signals can be connected to the 15-pin Sub-D socket with or without an adapter:

- VGA cable with 15-pin Sub-D connector (male) for the analog input to the 15-contact Sub-D connector (female).
- 5x BNC cable (RGBS, RGB and H+V Separate Sync), with the 5x BNC to VGA adapter.
- 4x BNC cable (RGB and H+V Composite Sync), with the 5x BNC to VGA adapter.
- 3x BNC cable (G and H+V Separate Sync), with the 5x BNC to VGA adapter.
- 2x BNC cable (G and H+V Composite Sync), with the 5x BNC to VGA adapter.
- 1x BNC cable (SoG, Sync on Green), with the BNC to VGA adapter.
- YPbPr (Component Video), with the 5x BNC to VGA adapter.

DVI socket

The DVI cable can be connected in two manners:

- Connect the DVI cable with DVI digital signal or DVI analog signal.

HDMI socket

Two types of cable can be connected to the HDMI socket:

- HDMI cable
- DVI cable (digital mode) with a DVI to HDMI adapter or cable

HD-SDI socket (BNC)

- Connect the video cable for the HD-SDI input to the BNC socket.

4-pin mini-DIN socket (video input)

- Connect the video cable for the sync video input (Y/C signal) to the 4-pole mini-DIN socket.

Composite BNC socket (video input)

- Connect the video cable for the Composite input to the BNC socket.

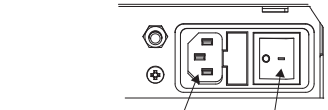
See also

Connector panel (Page 25)

6.5 Connecting the power cord

The power supply socket is on the rear of the flat panel display (only open using appropriate tool!). The display power supply is connected using an appliance plug.

- Insert the appliance plug of the supplied power cord into the mains socket.
- The power cord can be secured using a cable grip.



⚠ WARNING

- Only use the supplied power cord, or a cable with PE conductor and appliance plug to DIN 49 547, IEC 320 (max. length 3 m). Furthermore, the cable must adhere to all local safety regulations applicable to the specific country in which the display is used.
- Device fuses must only be replaced by the repair centers or servicing department.
- **Note for North America:** Molded power supply plugs must comply with the requirements for hospitals with respect to CSA Std. C22.2 No. 21 and UL 498.

See also

Connector panel (Page 25)
Power supply (Page 53)

Commissioning 7

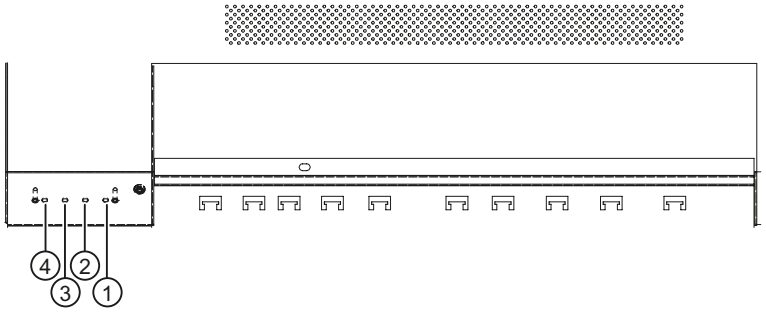
7.1 Switching on the unit

- Switch the device on using the power switch.

The EIZO logo is displayed for a short time.

- If no signal is present, a black image is output on the display.
- If a signal is present, the black image disappears.

7.2 Operator controls



①, ②, ③, ④: OSD operation (4 keys)

Figure 7-1 Rear view of RadiForce® LX470W: OSD operation

The four keys are located at the rear in the bottom right-hand corner of the display.

Key functions

In the OSD menu, the keys have the following functions:

Key	Action
1	• Open OSD menu • Toggle
2	• Navigate between submenu/tab • Decrease/change value
3	• Navigate between submenu/tab • Increase/change value
4	Leave OSD or submenu (settings are retained)

7.3 Description of OSD menu

7.3.1 OSD overview

The OSD menu is used to make settings for operation of the flat panel display with a source.

The OSD can also be operated without an input signal to a limited extent.

7.3.2 Menu functions

Program levels

Printed/identified in bold type Menu title (main menu or first submenu)

Main menu	Function	Adjustment/range	Description
Picture quality	**Brightness**	Slider control *Default: 50*	**Set brightness** Adapting the representation of darker picture areas. *Note* The brightness settings are already optimized for digital DVI signals. • Do not change the values manually, as this can result in an impairment of picture quality (loss of gray scales).
	Contrast	Slider control *Default: 50*	**Set contrast** Adapting the representation of brighter picture areas. *Note* The contrast settings are already optimized for digital DVI signals. • Do not change the values manually, as this can result in an impairment of picture quality (loss of gray scales).
	Backlight	Slider control *Default: Max. 50 %*	**Adjust brightness of display backlight** Adjustment of overall brightness to ambient lighting.

Main menu	Function	Adjustment/range	Description
	Color temperature	• Native • 9300°K • 7300°K • User *Default: User*	**Set the desired color temperature or hue** Three fixed color temperatures and one adjustable color temperature can be selected. You can define a different color temperature for each video input.
	Set user color	**Define user color temperature** The color setting defined here can be subsequently selected using the color function (selection "User"). *Note* If the color location setting is corrected with "Set user color", some color levels may be lost. • To prevent the loss of color levels, carry out a color correction via "LUT" with SMfit Total Care.	
	→Red	Slider control *Default: 50*	**Select red component of display**
	→Green	Slider control *Default: 50*	**Select green component of display**
	→ Blue	Slider control *Default: 50*	**Select blue component of display**
	Hue	Slider control *Default: 0*	**Setting of hue for RGB and video signals** *Note* "Hue" can only be set for S-Video or Composite signal.
	Saturation	Slider control	**Setting of saturation for RGB and video signals**
	LUT backlight command	On / Off	**Allows access to the backlight** When "On" is selected, the settings made in the "Backlight" menu are only available temporarily: • The settings made are rejected as soon as you switch off the display or change the source. "Backlight" is reset to the default setting of the firmware.

Main menu	Function	Adjustment/range	Description
	LUT	*Default: LUT1*	**Selection of LUT (Look Up Table)** An LUT changes the gamma curve of the display. By selecting a different LUT you can, for example, emphasize certain gray scales. *Note* Select a DICOM LUT for viewing x-ray images.
Image adjustment	**Perform auto adjustment…**	Execute	**Execution of autofunction** "Position", "Phase" and "Frequency" are set automatically. *Note* "Perform auto adjustment" can only be used with the analog signal inputs.
	Image size / zoom	• 1:1 • Fill screen • Fill to aspect ratio *Default: 1:1*	**Selection between different image size settings:** *1:1:* The picture is displayed on screen with its original resolution. *Fill screen:* The picture is displayed to fill the complete screen (1920 x 1080 pixels). *Fill to aspect ratio:* The picture is zoomed to the maximum screen area with retention of the aspect ratio.

Main menu	Function	Adjustment/range	Description
	Sharpness filter	Slider control	**Sharpness setting can be selected in order to reduce scaling artifacts or to make the image appear "softer"** *Note* You can only use the "Sharpness filter"function when the "Sharpness mode" menu has been set to "Normal". • You must visually determine which sharpness setting is best. A smaller value will generate a "softer" impression, and a higher value a "harder" impression. Common filters are available for the RGB picture sources (VGA, DVI). The interpolation filters depend on the input resolution. At lower resolutions, the filter calculates the value for the non-controlled pixels.
	Sharpness mode	Enhanced / Normal *Default: Enhanced*	• If you select "Enhanced", the picture with the sharpest setting is displayed. • If you select "Normal", you can make the picture appear "softer" using the sharpness control.
	H-Position	Slider control	**Shift picture in horizontal direction** With identical display and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.
	V-Position	Slider control	**Shift picture in vertical direction** With identical display and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.
	Phase	Slider control	**Setting the frequency and**

Main menu	Function	Adjustment/range	Description
	Frequency	Slider control	**phase of the input signal** • If the vertical lines are still slightly fuzzy, correct by adjusting the "Frequency/Phase" setting. *Note* We recommend that a vertical line from the "Pixel On/Off" test pattern is displayed.
Signal	**Active adjustment window**	• Main window (1) • PiP window (2) *Default: Main window (1)*	**Selecting the active adjustment window** • The menu "Active adjustment window" does not appear in the OSD until you have switched on "Picture layout PaP, PiP, PoP".
	Source selection	Select	**Select source for main display** Selection of picture source for full format image. • If you call this OSD menu, the currently displayed source is preselected.
	Source scan	On / Off *Default: On*	**If no signal is displayed: Activate/deactivate the automatic source scan** *On:* If the displayed source is no longer available, the display automatically searches for the next available source. *Off:* If the displayed source is no longer available, no image is displayed: The screen of the display is black. An image is displayed again: • If you switch on the source again. • If you manually select another signal source. *Note* If no signal is available, the display does not search for available sources.

Main menu	Function	Adjustment/range	Description
	Picture layout PaP, PiP, PoP	On / Off *Default: Off*	**Switching on or off the preconfigured picture layout (PaP; PiP; PoP)** 1. As soon as you switch on "Picture layout PaP, PiP, PoP", a selection "Active adjustment window" appears in each OSD Main menu. 2. You define whether the settings you have made for the OSD window also apply to the main or secondary window. The number displayed on the right-hand side of the OSD window indicates which window is currently active for the setting: • *1*: Main window • *2*: PiP window

Main menu	Function	Adjustment/range	Description
	Set picture layout	**Setting the picture layout**	
	→ Layout format	• Picture in picture (PiP) • Picture and picture (PaP) • Picture off picture (PoP) *Default: Picture in picture (PiP)*	**The following picture layouts can be selected using the menu "Set picture layout":** *Picture in picture (PiP):* The image content of a secondary window source is displayed over the main picture (≙ main window source). *Picture and picture (PaP):* Two pictures from a main window source and a secondary window source are displayed next to each other. *Picture off picture (PoP):* Up to five images from different window sources are displayed next to each other. • The image from the main window source is displayed larger on the bottom side of the window. • The other images are displayed in a smaller format on the top side. *Note* With "Picture off picture (PoP)" the images are displayed with a delay. You cannot use this setting for live mode.
	→ Main window source → Secondary window source		**Selection of the window sources which are displayed in the respective "Picture in picture (PiP)", "Picture and picture (PaP)" and "Picture off picture (PoP)" windows** See Section "Enable picture layout (PiP/PaP/PoP) (Page 42)" for possible combinations of signal sources.

Main menu	Function	Adjustment/range	Description
	→ Synchronization window	• Main window (1) • PiP window (2) *Default: Main window (1)*	**Set which of the main or secondary windows is selected as the synchronization window** *Note* The menu "Synchronization window" can only be used if the "Picture in picture (PiP) setting is active.
	PiP adjustments	The menu "PiP adjustments" can only be used if the "Picture in picture (PiP) setting is active.	
	→ PiP size		**Selection of "Picture in picture (PiP)" window size**
	→ H-Position	Slider control	**Setting of horizontal position of "Picture in picture (PiP)" window**
	→ V-Position	Slider control	**Setting of vertical position of "Picture in picture (PiP)" window**
	→ Transparency	Slider control	Selection of "Picture in picture (PiP)" window background ("Opaque" or "Transparent").
	Saturation adjustment	On / Off *Default: Off*	**Activates the color setting of the "Saturation" in the Picture quality main menu**
	Deinterlacing	Select	**Setting of "Deinterlacing" method** If an interlaced signal is present, you can select the "Deinterlacing" method.
	Color / Monochrome	• Color • Monochrome *Default: Color*	**Switching over of signal between black-and-white and color modes** If a monochrome signal is present, it appears green on the color display. • To obtain correct b/w images, set the signal parameter to "Monochrome".

Main menu	Function	Adjustment/range	Description
	ADC calibration...	Execute	**Automatically calibrate A/D converter for the applied video level** The video level range of the system is checked, and the display set accordingly. This results in optimum adjustment of the individual RGB A/D converters to the video source. The calibration results in a larger and more flexible video level range (e.g., the full brightness is also achieved at 700 mV if the video level is limited at this value). *Note* A particular test pattern is required! Please follow the instructions in the OSD menu. The A/D converters have already been factory-set and it is not usually necessary to readjust them in the field.

Main menu	Function	Adjustment/range	Description
	Switch loop	Slider control *Default: 1*	The following four parameters are of relevance to this setting: • H frequency • V frequency • V total • Interlaced/non-Interlaced If one of these parameters changes, the display treats it as a timing change and initiates resynchronization via an "Auto in progress". To prevent this from happening as a result of each and every minor signal disturbance, the value representing the permissible number of faulty or changed frames must be increased in the case of unstable signal sources. *Disadvantage* The higher the tab setting, the longer it will take for a desired timing change to occur (delayed by a number of milliseconds). *Note* You can only use Switch loop if "Source scan" is set to "On".
Utilities	**OSD**		
	→ Language	• German • English *Default: English*	**Use the "Language" menu to select the language of the OSD menu** German or English can be selected. English is the delivery default setting.
	→ Transparency	• Opaque • Transparent • Half transparent *Default: Opaque*	Selection of OSD background: "Opaque", "Transparent" or Half transparent.
	→ OSD time out	• Off • 5 s • 10 s • 30 s • 1 min *Default: Off*	**Close the OSD menu after a defined time**

Main menu	Function	Adjustment/range	Description
	→ Position	• Up left • Up middle • Up right • Middle left • Middle middle • Middle right • Bottom left • Bottom right *Default: Bottom right*	**Setting of position of OSD menu on screen from eight predefined positions**
	Power Save / DPMS		
	→ DPMS	On / Off *Default: On*	**The DPMS(Display Power Management-System) can be switched on/off** • The backlight is switched off or darkened if you activate "DPMS" but an input signal is not available. This saves power, and increases the service life of the backlight.
	→ Backlight	• Dimmed • Off *Default: Off*	**The "Backlight" can be set to "Dimmed" or "Off"** The Backlight is switched off or darkened if the DPMS modeis active.
	Communication		
	→ Communication interface	• DDC • USB *Default: DDC*	**Selection of interface for communication** The serial communication is always active. • You can additionally choose between USB and DDC.
	Source selection sequence	**The Source selection sequence defines the sequence in which the sources are to be automatically searched** Source selection is interrupted as soon as the first source with an active video signal has been found. This is then displayed.	
	Reset operations		**Reset display settings to factory defaults** The display settings are reset to the default setting of the firmware. *Note* All parameters are deleted and reset to the default setting of the firmware.

Main menu	Function	Adjustment/range	Description
Info		Information	**Current display settings and status information can be retrieved here in the respective picture mode.** • Serial number • Temperature [°C] • Power on time [h:m] • Backlight on time [h:m] • Backlight on above 350 cd/m² [h] • Source • Mode • Source timing • 2nd source • Mode • 2nd source timing • FW type • FW version • OSD version • Config version • SDK version

7.3.3 Lock/unlock OSD menu

CAUTION
Locking/unlocking of the OSD is only permissible for authorized servicing personnel. The OSD must be locked if a faulty operation on the part of the user could have a detrimental effect on the approved application of the display.

Lock

You can lock the call from the OSD if the OSD is not active.

To lock, enter the following key combination without interruption:

- Press button "4" once and then button "2" three times in quick succession.

  The OSD menu is locked.

Cancel locking

- Press button "4" once and then button "2" three times (if the OSD is not active).

  Locking of the OSD menu has been canceled.

Delivery state

The OSD is unlocked.

7.3.4 Picture layout (PaP/PiP/PoP)

PaP: Picture and picture

"Picture and picture" layout; two images from main and secondary window sources are displayed next to each other.

PiP: Picture in picture

"Picture in picture" layout; the image content of a secondary window source is displayed over the main picture (≙ main window source).

PoP: Picture on picture

"Picture on picture"Picture on picture" layout; up to five images from different window sources are displayed next to each other.

- The image from the main window source is displayed larger on the bottom side of the window.
- The other images are displayed in a smaller format on the top side.

Selection of picture sources

The main picture can be selected. The four other picture sources are automatically added in accordance with the table "Picture source combination".

NOTICE
Live images must not be displayed in PoP mode With "Picture off picture (PoP)" the images are displayed with a delay. You cannot use this setting for live mode.

Possible window source combination

The following window sources can be displayed simultaneously:

PiP / PaP Possible combinations	DVI digital	DVI analog	HDMI	VGA	S-Video	HD-SDI	Composite Video (CVBS)/SoG
DVI digital	-	-	+	-	+	+	+
DVI analog	-	-	+	-	+	+	+
HDMI	+	+	-	+	-	-	-
VGA	-	-	+	-	+	+	+
S-Video	+	+	-	+	-	-	-
HD-SDI	+	+	-	+	-	-	-
Composite Video (CVBS)/SoG	+	+	-	+	-	-	-

Picture source combination

Image settings on the PiP/PaP or PoP window

You can individually set the image display and quality of the various PiP/PaP/PoP windows.

1. As soon as you switch on the "Enable Picture Layout ", a selection "Active setup window" appears in each OSD main menu.
2. You define whether the settings you have made for the OSD window also apply to the main or secondary window.

   The number displayed on the right-hand side of the OSD window indicates which window is currently active for the setting:

   – 1: Main window

   – 2: Secondary window

See also

Menu functions (Page 30)

7.4 Implementing settings

7.4.1 Avoidance of image sticking

- Use a screen saver function in order to reduce "image sticking" that may occur with TFT displays.
- If the device is no longer required: Switch off the device.
- If the application permits a power saving mode, the device can be switched to this status: Set the option in your application for switching the device to power saving mode.

Image sticking

Image sticking is an effect in which a faint image of the previous screen contents can be seen after the display contents have changed. By using a screen saver with continuously changing screen contents, an unnecessary long depiction of a single image on the screen can be avoided.

7.4.2 Adjusting the image geometry

The display automatically recognizes the applied standard, and set-up values for each standard are preprogrammed. However, depending on the graphics card used, it may still be necessary to align and size the picture for the selected standard.

7.4.3 Adaptation of display – video source / graphics card

As with all monitors, the Flat Panel Display also has certain limits, e.g. maximum resolution and refresh rate.

- Set the graphics card when using the display such that the limits are observed.

Requirement

CAUTION
Exact setting only possible with photometer Exact setting of the brightness and contrast is only possible with a photometer: • Serial Spot Meter • Serial Luminance Meter • Universal Serial Luminance Meter • Advanced Serial Luminance Meter

CAUTION
Fine adjustment of analog inputs: only via 15-pin Sub-D and DVI-I sockets **Fine adjustment of digital input: Unnecessary** • Carry out the fine adjustment of the flat panel display only via the two analog ports (15-pin Sub-D and DVI-I sockets). • The digital input (DVI-D) does not require a fine adjustment of brightness and contrast since the signal display is always optimum. With a fine adjustment, it is possible that gray scales are not displayed.

RGB sources (via 15-pin Sub-D or DVI-I connector) supply analog signals which are basically intended for conventional CRT monitors and which are processed directly by them.

In contrast, the analog signals must be converted for the Flat Panel Display into digital signals by a video digitizer. Depending on the source, cable length and video mode (e.g. VGA, SVGA, XGA), this conversion may cause certain deviations which cannot be corrected fully automatically by the Flat Panel Display.

- You must carry out a manual fine adjustment to achieve optimum picture display with an analog input signal (VGA/DVI-I). By means of this manual fine adjustment, you match the flat panel display (or more exactly the video digitizer) to the respective video source.

In order to optimize the display settings for the installed graphics card and guarantee that all grayscales can be distinguished, we recommend that brightness and contrast are adjusted only for the analog inputs.

Configure display for optimum performance with the installed graphics card

Note that the calibration in the look-up table must not be affected by these settings.
EIZO GmbH displays are calibrated in the factory and retain the settings:

1. To reduce the brightness using the OSD control elements, use a picture with 0% gray value (black) and a suitable measuring instrument (we recommend the Serial Spot Meter).

   Reduce the brightness until the measuring instrument displays constant values: The measured value no longer changes.

   Then increase the brightness slightly until the display is just above the lowest black level (one step is generally sufficient).

2. To set the white value, use a test pattern with 100% gray value (white) and the measuring instrument.

   To ensure that the black value remains unchanged, only adjust the contrast.

3. Increase the contrast until the measuring instrument no longer registers an increase in light density.

   Subsequently reduce the setting of the contrast controller again by 1 to 2 steps until the measured brightness is slightly below the maximum value.

4. Make sure once again that the black value has not changed.

   The black value may change if the contrast has been corrected by a large amount. In this case, repeat the previously mentioned steps.

Result

The display is now configured for optimum performance with the installed graphics card. If you are still not satisfied with the light density, you can increase the black and white values further by adjusting the backlighting in the OSD menu.

CAUTION
A permanently higher setting for the backlighting may reduce the brightness performance
Please note that a permanently higher setting for the backlighting results in a more rapid reduction in the service life.

Fast adjustment without measuring instrument

Exact adjustment is only possible with a measuring instrument.

If a measuring instrument for the fine adjustment is not available, proceed as follows:

1. Use the SMPTE test pattern.
2. Adjust the brightness so that image sections with 5% and 0% gray value still visibly contrast.
3. Adjust the contrast so that image sections with 95% and 100% gray value still visibly contrast. To adapt the luminosity to the ambient lighting, adjust the backlight brightness (note: factory-set brightness is no longer observed).

7.4.4 Power management

Power management settings

Observe the instructions of the operating system manufacturer regarding the power management settings. The display supports the so-called DVI DMPM mode (Digital Monitor Power Management) which can be applied to save energy.

By means of DVI DMPM, the display can be switched off automatically, e.g. after 20 minutes.

7.4.5 Check for pixel defects

Pixel defects (small bright or dark dots) can occur in LCD monitors. During the manufacturing process, all displays are checked for the permitted number of defective pixels.

During start-up you can check the display e.g. using SMfit Total Care as follows:

- Generate a black test screen and examine the screen for luminous pixel errors.
- Generate a white test screen and examine the screen for non-luminous pixel errors.

Pixel defects on an LCD monitor can not be corrected.

Software description

8

8.1 Program for changing the display settings

Note

The RadiForce® LX470W display features a latest generation controller module and is supported by the SMfit Total Care calibration and quality control software.

SMfit Total Care

The SMfit Total Care program is supplied on the enclosed software and documentation CD. The software is also available as a free download on the EIZO Display Technologies website.

Used in conjunction with EIZO photometers, SMfit Total Care is a powerful calibration software tool. The software includes extensive options for adjusting and verifying an LC display.

The software and documentation CD contains SMfit Total Care documentation. Additional information is available in a Readme.txt file on the installation CD.

See also

http://www.eizo.eu

http://www.radiforce.com

Operate 9

9.1 Note for users

CAUTION
Settings must not be changed by users None of the settings may be changed on site by the user. This also applies to settings made using the display keys. These are therefore locked for certain applications. If settings have to be changed, please contact the responsible servicing department. **If keyboard is locked, contact Service department** If the keyboard is locked, contact the service department in order to unlock it. If you unlock it yourself, the warranty will no longer be valid!

9.2 Switching on the display

Once installed, operating the display consists mainly of switching the power on and off.

- Switch the device on using the power switch.

Service and maintenance 10

10.1 Cleaning

CAUTION
Device maintenance, cleaning and disinfecting • The front panel is extremely sensitive to mechanical damage. Avoid all scratches, knocks etc.! • Remove drops of liquid immediately; contact with liquids over a longer period can cause discoloration or allow calcium deposits to form on the surface. • Clean the front panel when dirty using a microfiber cloth and, if necessary, a recommended cleaning agent. Only clean housing parts using the recommended cleaning agents. • The entire display must only be disinfected using the tested disinfecting agents. • If cleaning agents are sprayed directly onto the display surface, use a microfiber cloth to catch drops which run down before they reach the edge of the panel.

Recommended cleaning agents and disinfectants for the monitor:

Agent class	Tested cleaning and disinfection agents:	Further examples
Alcohol	Ethyl alcohol, 96 %	Hospiset cloth Mikrozid liquid
Aldehyde	Melsitt Cidex	Aldasan 2000 Kohsolin Gigasept FF
Chlorine derivatives	Terralin	Quartamon Med
Disinfecting agents	Morning Mist	
Guanidine derivatives	Lysoformin	
Quaternary compounds	Incidur spray, undiluted	
Standard household washing-up liquid	Tempo	Fairy Ultra, Pril, Palmolive
Pyridine derivatives	Activ spray, undiluted	
Water	Tap water Distilled water	

Note

Information on cleaning or disinfection of other system components can be obtained from the respective instructions for use.

10.2 Maintenance

Routinely check the display settings

The display requires little maintenance. The illumination properties may change slowly due to aging of the LCD unit and the backlight. For this reason, periodically check and, if necessary, correct the display settings to ensure compliance with local guidelines. EIZO also recommends checking the displays for pixel errors.

Measuring instruments

The following devices can be used as measuring instruments:

- Serial Spot Meter
- Universal Serial Luminance Meter
- Advanced Serial Luminance Meter

These photometers can be connected directly to the display.

Carry out quality tests automatically

One can automatically perform all quality tests using the SMfit Total Care program.

Verify and calibrate display properties

The photometers can be used to verify and, if necessary, calibrate the display properties.

Manual modification of settings

One can also manually adjust display settings using a Serial Spot Meter and the SMfit Total Care program.

NOTICE
Confirm image quality visually after calibrating the display After calibration, the display must be visually inspected to verify successful and correct completion of the calibration procedure. This inspection can be performed by reviewing the SMPTE image. The gray levels should be displayed correctly and visibly at both 5 % and 95 %. Alternatively, the VerLum image can serve as a useful test pattern. Successful calibration can be verified if the small squares are displayed correctly in all gray shades.

See also

Check for pixel defects (Page 46)
Program for changing the display settings (Page 47)

Technical specifications

11

Applicability of technical specifications

All technical specifications are valid after a warming-up period of 30 minutes.

11.1 Display features

Type	Color, TFT, S-IPS
Image Size	1039.7 mm x 584.8 mm
Screen diagonal	47" (119.3 cm)
Resolution	1920 x 1080
Refresh rate	60 Hz
Pixel arrangement	24 bit (3 x 8 bit): 3 subpixels per pixel
Pixel spacing	0.5415 mm x 0.5415 mm
Contrast ratio	Typically 1000:1
Horizontal viewing angle	178° typical
Vertical viewing angle	At least 178°
Response time (gray to gray)	6.5 ms
Backlighting	32 CCFL
Screen brightness	Typically 700 cd/m²
Lifetime of backlight	Typically 50 000 hours (at operating temperature of 25 °C)

11.2 Power supply

Power connector	Non-heating appliance socket
Line voltage	90 to 264 V AC
Line frequency	47 ... 63 Hz
Current consumption	Max. 2.7 A ... max. 1.1 A
Energy consumption	Max. 270 W
Energy-saving mode	DVI DMPM

11.3 Electronics

Multi-standard technology	Video modes with resolutions less than 1920 x 1024 can be expanded to the TFT resolution, and thus utilize the full display area (like multi-sync CRTs) Interpolation artifacts must be expected when displaying images with a resolution other than 1920 x 1024. *Caution* If the timing is frame-buffered or frame-synchronized, parts of the picture information may be lost; the grayscales - the hue for color images - are also reduced and may be visible).
Timing recognition	H frequency, V frequency, interlaced, number of horizontal lines

11.4 Inputs/Outputs

Analog signal input

RGB input, H/C-Sync input and V-Sync input	via 15-pin Sub-D connector (female), any polarity
DVI input	Via DVI-I socket (analog pins are used)
RGB signal	• Video level: 0,5 ... 1.0 V_{pp} • Sync level: TTL-compatible
SoG signal	Via 15-pin Sub-D connector and CVBS input • Video level: 0,5 ... 1.0 V_{pp} • Sync level: 0,2 ... 0.3 V_{pp}

Digital signal input

DVI input	Via DVI-I or HDMI socket, single link
DDC	via DVI
HDMI input	Via HDMI socket, HDMI version 1.0
HD-SDI	Via HD-SDI (BNC) socket

Video input

S-Video	Via 4-pin mini-DIN socket
Composite	Over 1x BNC socket
Composite & S-Video	• Video level: 0,5 ... 1.4 V_{pp} • Sync level: 0,2 ... 0.3 V_{pp}
Standards	PAL (625 lines / 50 Hz) NTSC (525 lines / 60 Hz)

Analog signal output

RGB input, H/C-Sync input and V-Sync input	via 15-pin Sub-D connector (female), any polarity
RGB signal	• Video level: 0,5 ... 1.0 Vpp • Sync level: TTL-compatible
SoG signal	Via 15-pin Sub-D connector and CVBS input • Video level: 0,5 ... 1.0 Vpp • Sync level: 0,2 ... 0.3 Vpp

Digital signal output

HD-SDI	Via HD-SDI (BNC) socket

Video output

S-Video	Via 4-pin mini-DIN socket
Composite	Via 1x BNC socket
Composite & S-Video	• Video level: 0,5 ... 1.4 V_{pp} • Sync level: 0,2 ... 0.3 V_{pp}
Standards	PAL (625 lines / 50 Hz) NTSC (525 lines / 60 Hz)

Serial interface

RS 232	Via RJ 11 socket (female)

11.5 Controls and connectors

Rear side	• 4x OSD keys • 1x power connection socket • 1x DVI-I socket • 1x 15-pin 3-row Sub-D socket • 2x BNC sockets • 1x 4-pin mini-DIN socket • 2x RS 232 sockets (RJ11) • Voltage source for connection of external devices (5 V/1 A)

11.6 Mechanical design

Housing components	Metal
Housing color	• White (NCS S 1000-N) • Black (RAL 7021)
Protective glass	Protective glass optically coated on both sides
Ventilation openings	In rear panel
Degree of protection	• IP20 in accordance with DIN 40050 (monitor) • Front panel splash-proof (designed for IP54)
Connection panel	On rear panel, under cover
Weight in kg	40 kg
Dimensions (W x H x D) in mm	1101 x 646 x 106

11.7 Climatic conditions

Operation

Temperature range	+5 °C ... +40 °C ambient temperature
Temperature gradient	Max. 5 °C/h, no condensation
Air pressure	700 ... 1060 hPa

Transport and storage (packed)

Temperature range	-20°C ... +55 °C ambient temperature
Temperature gradient	Max. 5°C/h, no condensation
Humidity	10 ... 95 %, non condensing, at 25 °C
Air pressure	500 ... 1060 hPa

11.8 Mechanical requirements

Operation

Vibrations	To EN 60068-2-6 10 ... 58 Hz at ± 0.075 mm oscillation 58 ... 500 Hz at 10 m/s², 10 cycles per axis
Shock	To EN 60068-2-27; EN 60721-3-3 50 m/s² half-sine, 3 shocks per axis

Packaged unit

Vibrations	To EN 60068-2-64 EN 60721-3-2, Class 2M2
Shock	To EN 60068-2-27

11.9 Safety regulations

CE

This product has been assigned a CE marking in compliance with the directives of guideline 93/42/EEC of June 14, 1993, concerning medical products.

Safety standards	• EN 60601-1 • CAN/CSA - C 22.2 No. 601.1 • UL 60601-1
Protection class	Protection class I
Degree of protection	• IP20 (display) • Front panel splash-proof (designed for IP54)
Conformity	CE to MPG 93/42/EEC (Class I)

11.10 Electromagnetic compatibility

Interference voltage/emitted noise	EN 60601-1-2 Class A FCC Class A
Burst on power cables	EN 61000-4-4 2 kV
Burst on signal lines	EN 61000-4-4 1 kV
Surge on power cables	EN 61000-4-5 1 kV symmetric, 2 kV unsymmetric
Electrostatic discharge on casing parts (ESD)	EN 61000-4-2 8 kV air, 6 kV contact
RF irradiation	EN 61000-4-3 80 MHz ... 2500 MHz, 3 V/m 80 % AM 1 kHz
	EN 61000-4-8
Constant magnetic fields	4000 A/m (maximum)
Alternating magnetic fields	1000 Aeff/m (maximum)
Line reaction to harmonics	EN 61000-3-2
Line reaction to voltage fluctuations	EN 61000-3-3
Voltage fluctuations	EN 61000-4-11

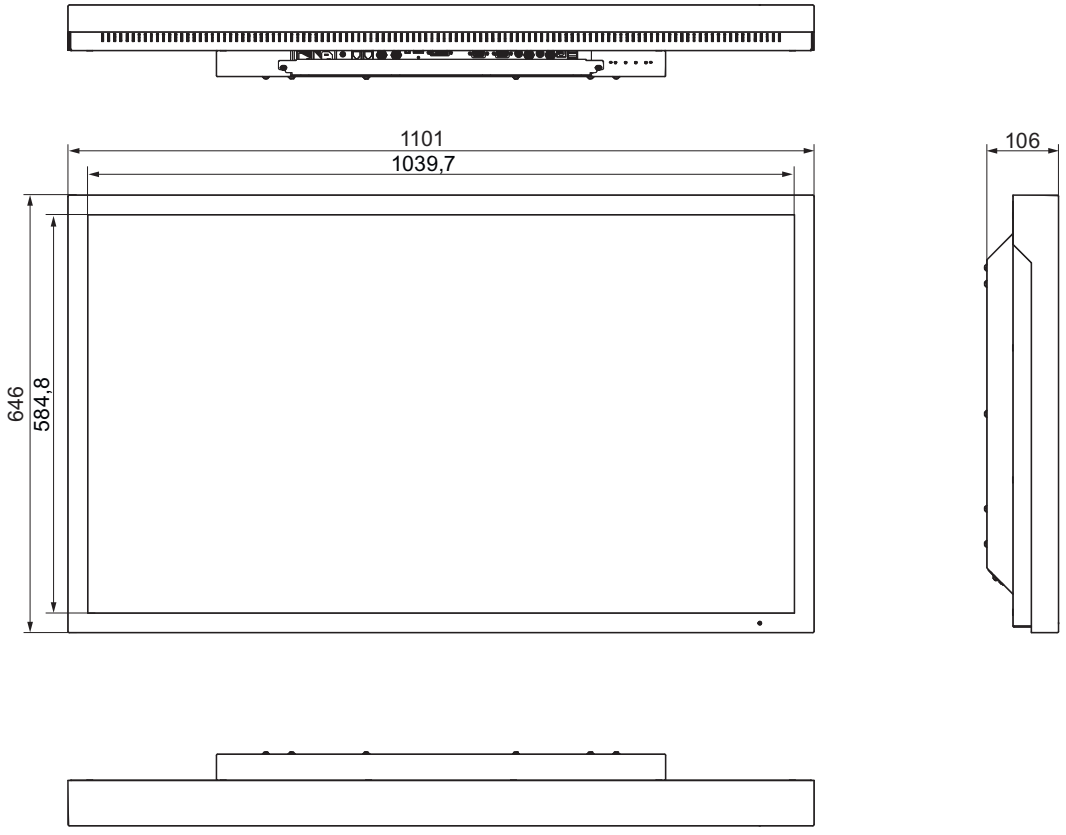
See also

Guidance and manufacturer's declaration – electromagnetic emissions (Page 61)

Dimensional drawings

12

All dimensions in mm



Appendix

A

A.1 Guidance and manufacturer's declaration – electromagnetic emissions

The RadiForce® LX470W display is intended for use in the electromagnetic environment specified below. The customer or the user of the display should assure that it is used in such an environment.

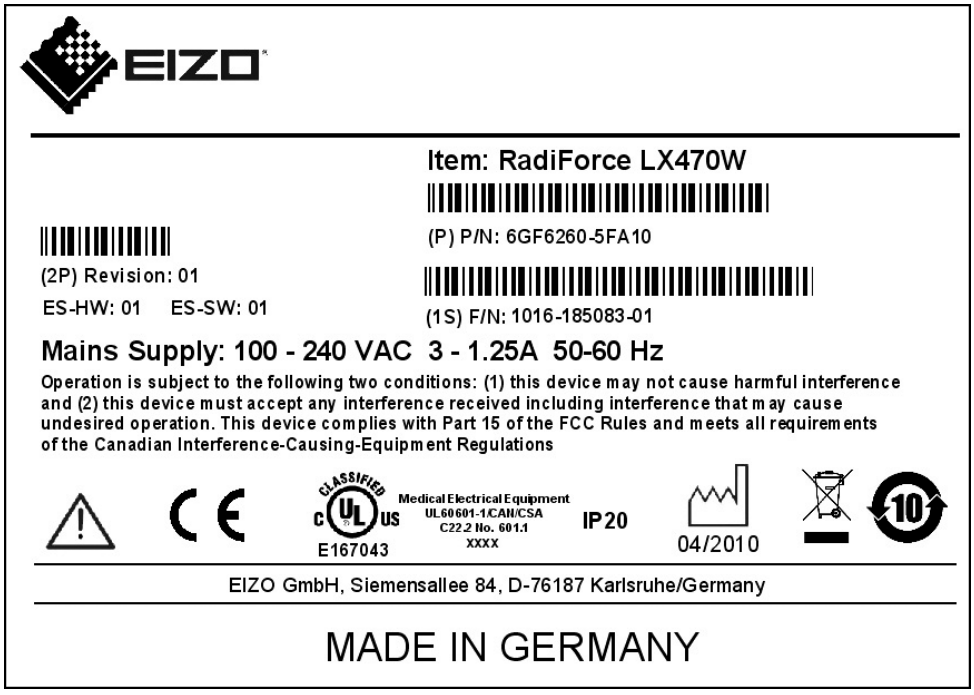
Emissions test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The display uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The display is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

See also

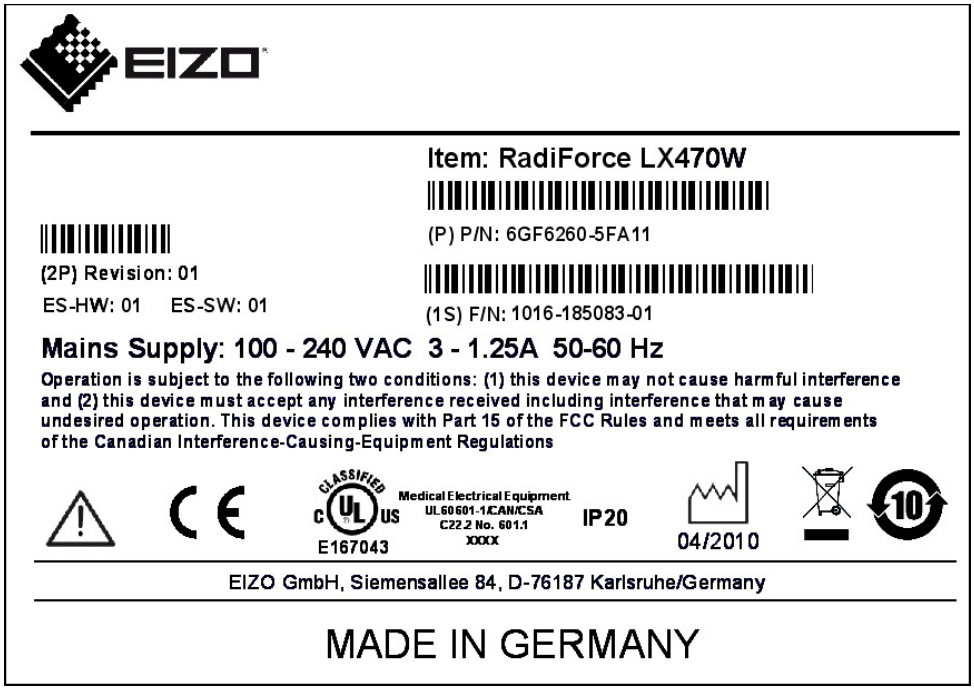
Electromagnetic compatibility (Page 58)

A.2 Nameplate

RadiForce® LX470W white (Order No.: 6GF6260-5FA10)


EIZO
Item: RadiForce LX470W
(P) P/N: 6GF6260-5FA10
(2P) Revision: 01
ES-HW: 01 ES-SW: 01
(1S) F/N: 1016-185083-01
Mains Supply: 100 - 240 VAC 3 - 1.25A 50-60 Hz
Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received including interference that may cause undesired operation. This device complies with Part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing-Equipment Regulations
CLASSIFIED
c UL us
E167043
Medical Electrical Equipment
UL60601-1/CAN/CSA
C22.2 No. 601.1
XXXX
IP20
04/2010
EIZO GmbH, Siemensallee 84, D-76187 Karlsruhe/Germany
MADE IN GERMANY

RadiForce® LX470W black (Order No.: 6GF6260-5FA11)


EIZO
Item: RadiForce LX470W
(P) P/N: 6GF6260-5FA11
(2P) Revision: 01
ES-HW: 01 ES-SW: 01
(1S) F/N: 1016-185083-01
Mains Supply: 100 - 240 VAC 3 - 1.25A 50-60 Hz
Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received including interference that may cause undesired operation. This device complies with Part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing-Equipment Regulations
CLASSIFIED
c UL us
E167043
Medical Electrical Equipment
UL60601-1/CAN/CSA
C22.2 No. 601.1
XXXX
IP20
04/2010
EIZO GmbH, Siemensallee 84, D-76187 Karlsruhe/Germany
MADE IN GERMANY

Meaning of designations and symbols on the nameplate

Designation/symbol	Meaning
	Symbol for "Caution, observe accompanying documents"
CE	CE symbol (EU mark of conformity)
CLASSIFIED C UL US E167043	UL symbol with observation of US and Canadian directives
Medical Electrical Equipment UL60601-1/CAN/CSA C22.2 No. 601.1 licence no xxx	Identification as medical device
IP 20	Identification of IP degree of protection
 11/2009	Symbol for manufacturing date of medical products
	WEEE (Waste Electrical and Electronic Equipment) Product must be disposed of separately; materials can be recycled
	Symbol in accordance with ACPEIP (Administration on the Control of Pollution Caused by Electronic Information Products) (China RoHS)

A.3 Warranty

Opening of the housing, or electrical or mechanical changes on or in the device, result in cancellation of the warranty. For warranty details, please contact the sales partner from whom you purchased the product. These warranty conditions are neither extended nor limited by the contents of this user manual.

A.4 Repairs

Please contact the sales partner from whom you purchased the product.

A.5 Environmental protection

Please observe all local requirements and laws pertaining to the disposal of displays.

A.6 Accessory devices

Devices connected to the display (e.g. PC) must also comply with the relevant safety specifications.

A.7 Trademarks

The EIZO Logo is a registered trademark of EIZO NANAO CORPORATION in Japan and other countries.

EIZO is a registered trademark of EIZO NANAO CORPORATION in Japan and other countries.

RadiForce is a registered trademark of EIZO NANAO CORPORATION in Japan and other countries.

RadiCS is a registered trademark of EIZO NANAO CORPORATION in Japan and other countries.

RadiNET is a registered trademark of EIZO NANAO CORPORATION in Japan and other countries.

ScreenManager is a registered trademark of EIZO NANAO CORPORATION in Japan and other countries.

SMfit is a trademark licensed to EIZO NANAO CORPORATION.

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

Apple is a registered trademark of Apple Inc.

Macintosh is a registered trademark of Apple Inc.

Mac is a registered trademark of Apple Inc.

VGA is a registered trademark of International Business Machines Corporation.

VESA is a registered trademark or a trademark of Video Electronics Standards Association in the United States and other countries.

All other trademarks are the properties of their respective owners.

A.8 Contact

Support during installation and for technical questions

http://www.eizo.eu

http://www.radiforce.com

A.9 China RoHS (Restriction of Hazardous Substances)

LCD Display 液晶显示器
型号 Model: 6GF6260-5FA##

根据SJ/T11364-
2006《电子信息产品污染控制标识要求》特提供如下有关污染控制方面的信息。
The following product pollution control information is provided according to SJ/T11364-2006 Marking for Control of Pollution caused by Electronic Information Products.

电子信息产品污染控制标志说明 Explanation of Pollution Control Label

该标志表明本产品含有超过中国标准SJ/T11363-
2006《电子信息产品中有毒有害物质的限量要求》中限量的有毒有害物质。标志中的数字为本产品的环保使用期，表明本产品在正常使用的条件下，有毒有害物质不会发生外泄或突变，用户使用本产品不会对环境造成严重污染或对其人身、财产造成严重损害的期限。单位为年。
为保证所申明的环保使用期限，应按产品手册中所规定的环境条件和方法进行正常使用，并严格遵守产品维修手册中规定的定期维修和保养要求。
产品中的消耗件和某些零部件可能有其单独的环保使用期限标志，并且其环保使用期限有可能比整个产品本身的环保使用期限短。应到期按产品维修程序更换那些消耗件和零部件，以保证所申明的整个产品的环保使用期限。
本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理。
This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard SJ/T11363-2006 *Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products*. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the toxic or hazardous substances or elements contained in electronic information products will not leak or mutate under normal operating conditions so that the use of such electronic information products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year".
In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.
Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures.
This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

有毒有害物质或元素的名称及含量 Name and Concentration of Hazardous Substances

部件名称 Component Name	有毒有害物质或元素 Hazardous substances' name					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
液晶纯平屏幕 LCD Flat Screen	O	O	O	O	O	O
平面灯 Flat Lamp	X	X	O	O	O	O
背光逆变器 Backlight Inverter	O	O	O	O	O	O
控制板 Controller Board	O	O	O	O	O	O
电源 Power Supply	O	O	O	O	O	O
其他 电路板 Other Circuit Boards	O	O	O	O	O	O
其他（电缆等） Others (cables, etc.)	O	O	O	O	O	O
机架、底盘 Housing, Chassis	O	O	O	O	O	O
附件（信号电缆、输电线等） Acessories (signal cable, power line, etc.)	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求

- 此表所列数据为发布时所能获得的最佳信息.
- 由于缺少经济上或技术上合理可行的替代物质或方案，此医疗设备运用以上一些有毒有害物质来实现设备的预期临床功能，或给人员或环境提供更好的保护效果。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.
X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006

- Data listed in the table represents best information available at the time of publication.
- Applications of hazardous substances in this medical device are required to achieve its intended clinical uses, and/or to provide better protection to human beings and/or to environment, due to lack of reasonably (economically or technically) available substitutes.

产品中有毒有害物质或元素的名称及含量 Table of hazardous substances' name and concentration.

List of abbreviations

B

Abbreviation/symbol	Explanation
C	
CRT	Cathode Ray Tube
D	
DDC	Display Data Channel
DIN	German Institute for Standardization
DPMS	Display Power Management Signaling
DVI	Digital Visual Interface
DVI-A	Digital Visual Interface - Analog
DVI-D	Digital Visual Interface - Digital
DVI-I	Digital Visual Interface - Integrated
I	
ESD	Electrostatic Discharge
EMC	Electromagnetic compatibility
EN	European standard
F	
FCC	Federal Communications Commission
H	
HF	High Frequency
L	
LCD	Liquid Crystal Display
LUT	Look Up Table
O	
OSD	On-screen display
S	
SMfit Total Care	Display QA software
SMPTE	Society for Motion Picture and Television Engineers
SVGA	Super Video Graphics Array
T	
TN-S mains	Terre Neutre–Separé
TFT	Thin Film Transistor
V	
VGA	Video Graphics Array
VESA	Video Electronics Standards Association

Abbreviation/symbol	Explanation
X	
XGA	Xtended Graphics Array
Units of measurement:	
Cd/m²	Candela/m² (photometric measurement for brightness)
ftL	3.426 cd/m²

Index

1

15-pin Sub-D socket, 26

A

Ambient temperature
  Operation, 58
  Transport and storage (packed), 58
Ambient temperature range, 19
Analog signal input, 56
Analog signal output, 57
Appliance plug, 28
Avoid dusty environments, 19

B

BNC socket (video input), 27

C

Carry out quality tests automatically, 52
Change of environment, 20
Communication interface
  Power Safe Mode, 16
Connections, 25

D

Digital signal input, 56
Digital signal output, 57
Display
  Avoid dusty environments, 19
  Avoid reflections on the screen, 19
  Cleaning and disinfection agents, 51
  Dimensions, 58
  Minimum clearance to other devices, 20
  Performance features, 16
  Weight, 58
DMPM
  Digital Monitor Power Management, 46
DVI socket, 27

E

Electromagnetic compatibility
  Standards/guidelines, 60

F

Fine adjustment
  Analog inputs, 45
  Digital input, 45
Fully Automated Stability
  Fully Automated Stability, 16

G

Grounding measures, 23

H

HDMI socket, 27
HD-SDI socket, 27

I

Image sticking, 44
ISS
  Integrated stability system, 16

L

Lifetime of backlight, 55

M

Manually change display settings
  With Serial Spot Meter and SMfit Total Care, 52
Measuring instruments
  for maintenance, 52
Mini-DIN socket (video input), 27

N

Nameplate, 65

Note
on cable installation, 23

O

Observe EMC requirements when connecting, 23
Order No.
RadiForce® LX470W, 15
OSD menu
Cancel locking, 41

P

Packaging material, 15
PaP (picture and picture)
"Picture and picture" layout, 42
Photometers
Verify and calibrate display properties, 52
PiP (picture in picture)
"Picture in picture" layout, 42
Pixel defects
Correcting defective pixels, 46
PoP (picture off picture)
"Picture on picture" layout, 42
Power connector, 55
Power cord, 28
Power supply, 28
Power supply connectors
Note for North America, 28
Product disposal, 66
Protective glass, 17

R

RGB analog sockets, 26
RGB input
15-pin Sub-D, DVI and HDMI input socket, 17

S

Save energy
DVI DMPM mode, 46
Screen brightness, 55
Serial interface, 57
Service
Authorized personnel, 9
Settings
Application-optimizing, 17
Shielding measures, 23
SMfit Total Care, 7
Carry out quality tests automatically, 52
Information on, 47
Settings for optimizing the application, 17
specifications
Fastening screw, 21
Sub-D socket, 26
Support
During installation and for technical questions, 67

U

User
Health personnel, 9

V

Ventilation, 19
Verify and calibrate display properties, 52
Video input, 57
Video inputs
Mini-DIN and Composite BNC sockets, 27
Video output, 57

W

Warranty conditions, 66

Order No.: 1015263-001

EIZO GmbH
Display Technologies

Siemensallee 84
76187 KARLSRUHE
GERMANY

www.eizo.eu